REMARKS

Rejections under 35 U.S.C. §103

Claims 1-3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Koshida et al. (WO 02.057353) in view of the admitted prior art and Hoeschle (US 4,351,757). The examiner has stated that Koshida et al. teach a method of laser welding a first polymeric object (which can be poly(ethylene terephthalate) (PET)) to a second polymeric object and that the PET object can contain nucleating agents. The examiner has further stated that the admitted prior art discloses that nucleating agents are commonly used to speed up the crystallization of PET to enhance its moldability. Neither Koshida et al. nor the admitted prior art describe the use of nucleating agents that absorb no more than 7% of their weight in water or that the first polymeric object has a transmittance of at least 15% of the laser radiation.

The examiner stated that Hoeschle teaches the use of sodium stearate to increase the crystallization rate of PET. The examiner further stated that one skilled in the art would have known to use a known nucleating agent for PET in the method of Koshida, and thus that one skilled in the art would have expected as a natural result that the PET would have a diffuse transmittance of at least 15% of the laser radiation.

Though a wide variety of nucleating agents are used to improve the processability of PET, it is not true that the use of any of them selected at random will have the result of yielding a PET composition having a diffuse transmittance of at least 15% of the laser radiation. For example, sodium neutralized ethylene/methacrylic acid copolymers (such as Surlyn® 8920, supplied by E.I. du Pont de Nemours, Inc.) are very commonly used nucleating agents for PET. Yet, as is illustrated by Comparative Examples B-E of the present invention, when Surlyn® 8920 is used in PET compositions at a high enough level to provide good moldability, the compositions have insufficient transmittance to laser radiation to be laser welded.

Furthermore, it is desirable to be able to laser weld the first object after it has been exposed to humid conditions for an extended period of time and that the resulting weld retain its strength after extended exposure to humid conditions. (See, for example, page 2, lines 21 to 27 of the present application.) Trisodium phosphate (TSP) is another additive known to be an effective nucleating agent for PET.

However, it absorbs well more than 7% of its weight in water and its use leads to compositions having unacceptable laser welding results.

For example, as illustrated in Comparative Example F, though PET compositions containing TSP that have been exposed to the relatively mild conditions of 65% relative humidity at 23 °C for 24 hours may have sufficient transmittance to the laser radiation to be laser welded, the strength of the resulting weld deteriorates to the point of being unacceptable after the welded article has been exposed to 95% relative humidity at 80 °C for 1000 hours followed by 65% relative humidity at 23 °C for 24 hours. Example 8, on the other hand, illustrates that compositions containing the nucleating agent sodium montanate, which absorbs less than 7% of its weight in water, may not only be laser welded after exposure to the relatively mild conditions of 65% relative humidity at 23 °C for 24 hours, but the resulting weld strength is retained after the welded article has been exposed to 95% relative humidity at 80 °C for 1000 hours followed by 65% relative humidity at 23 °C for 24 hours.

Example 9 and Comparative Example G show that PET compositions containing TSP are no longer sufficiently transparent to laser light to be laser welded after they have been exposed to 95% relative humidity at 80 °C for 1000 hours, whereas PET compositions containing sodium montanate may still be effectively laser welded even after exposure to the same conditions.

There is no teaching in the disclosures of Koshida et al. and Hoeschle of the use in laser welding of objects made from nucleated PET compositions characterized by the particular combination of properties that the nucleating agents used absorb no more than 7% of their weight in water, and that when used in an amount sufficient such that the PET compositions have a crystallization half time of less than 20 minutes at a temperature of 105 °C, the polymeric objects have a diffuse transmittance of at least 15% of laser radiation. Nor do Koshida et al. and Hoeschle provide any hint that the use of such compositions will yield objects that maintain their weld strengths upon exposure to humidity when laser welded. Nor is there any teaching that the objects will maintain sufficient transparency to laser radiation to permit them to be laser welded upon prolonged exposure to humidity prior to welding.

Thus one skilled in the art would have had no motivation to select any particular nucleating agent for PET compositions, including that disclosed in Hoeschle, with any expectation that the compositions may be not only effectively

laser welded both when dry and after prolonged exposure to humidity, but that the resulting weld strengths will be maintained when the welded articles are exposed to humidity.

Claims 1-3 are therefore believed to be nonobvious and patentable.

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

ARNE R. JARNHOLM
ATTORNEY FOR APPLICANT
Registration No.: 30,396
Telephone: (302) 992-2394
Facsimile: (302) 992-3257

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